

WHAT IS CLAIMED IS:

1. A method for producing DNA, which comprises the following steps (1) to (4):
- (1) dividing a target sequence which is a nucleotide sequence of DNA to be synthesized into $2N$ wherein N is a positive integer, of sections, designing partial sequences each containing a nucleotide sequence of each section and a part of a nucleotide sequence of an adjacent section or parts of nucleotide sequences of adjacent sections, wherein the part or parts have such a length that the nucleotide sequence of the each part can specifically make base-pairing with a nucleotide sequence complementary thereto, and preparing oligomers each having each of the 1st to N th partial sequences from the 5' end of the target sequence and oligomers each having a nucleotide sequence complementary to each of the $(N+1)$ th to $(2N)$ th partial sequences from the 5' end of the target sequence,
- (2) performing PCR by using an oligomer having the N th partial sequence from the 5' end of the target sequence and an oligomer having a nucleotide sequence complementary to the $(N+1)$ th partial sequence from the 5' end of the target sequence under such a condition that these oligomers should act as primers and templates,
- (3) sequencing synthesized DNAs and selecting DNA

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having a nucleotide sequence containing the Nth and (N+1)th partial sequences from the 5' end of the target sequence, and

(4) repeating the following steps (4a) and (4b) for J wherein J is an integer, to be from 1 to N-1:

(4a) performing PCR by using the selected DNA, an oligomer having the (N-J)th partial sequence from the 5' end of the target sequence and an oligomer having a nucleotide sequence complementary to the (N+1+J)th partial sequence from the 5' end of the target sequence under such a condition that the DNA and oligomers should act as primers and templates, and

(4b) sequencing synthesized DNAs and selecting DNA having a nucleotide sequence containing the (N-J)th to (N+1+J)th partial sequences.

2. A method for producing DNA, which comprises the following steps (1) to (4):

(1) dividing a target sequence which is a nucleotide sequence of DNA to be synthesized into 2^n wherein n is a positive integer, of sections, designing partial sequences each containing a nucleotide sequence of each section and a part of a nucleotide sequence of an adjacent section or parts of nucleotide sequences of adjacent sections, wherein the part or parts have such a

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length that the nucleotide sequence of each part can specifically make base-pairing with a nucleotide sequence complementary thereto, and preparing oligomers each having each of (odd number)th partial sequences from the 5' end of the target sequence and oligomers each having a nucleotide sequence complementary to each of (even number)th partial sequences from the 5' end of the target sequence,

(2) repeating the following step (2a) for j wherein j is an integer, to be from 1 to 2^{n-1} to produce 2^{n-1} of reaction products,

(2a) performing PCR by using an oligomer having the $(2j-1)$ th partial sequence from the 5' end of the target sequence and an oligomer having a nucleotide sequence complementary to the $(2j)$ th partial sequence from the 5' end of the target sequence under such a condition that these oligomers should act as primers and templates,

(3) repeating the following step (3a) for i wherein i is an integer, to be from 2 to n :

(3a) repeating the following step (3ai) for k wherein k is an integer, to be from 1 to 2^{n-i} to produce 2^{n-i} of reaction products,

(3ai) mixing a reaction mixture containing DNA having the $(2^i \cdot (k-1) + 1)$ th to $(2^i \cdot (k-1/2))$ th partial sequences from the 5' end of the target sequence and a reaction mixture containing DNA having a

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sequence complementary to the $(2^i \cdot (k-1/2)+1)$ th to $(2^i \cdot k)$ th partial sequences from the 5' end of the target sequence and performing PCR under such a condition that DNAs contained in the reaction mixtures should act as primers and templates, and (4) separating DNAs having a length expected from the target sequence from the reaction mixture, and sequencing the separated double strand DNAs to select a double strand DNA having the target sequence.

3. The method according to Claim 2, wherein, in the steps (2a) and (3ai), a ratio of the oligomers added to the reaction mixture or a ratio of the reaction mixtures to be mixed is adjusted so that a single strand DNA required for a subsequent step should be synthesized in an amount larger than that of the other single strand DNA.

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